

CLAIMS

1. A method of cost-sensitive control of data transfer between a mobile entity and a data
 5 network through a cellular radio infrastructure, the method involving carrying out the following steps at a service system connected to the data network,
 - (a) receiving a transfer descriptor indicative of, at least in general terms, the end points of a required data transfer, and of transfer criteria, comprising at least a cost criterion, to be met by the data transfer;
 - 10 (b) determining whether and, if so, how, the data transfer can be effected within the transfer criteria;
 - (c) where step (b) produces a positive determination, instructing initiation of the data transfer in accordance with that determination.
- 15 2. A method according to claim 1, wherein the transfer descriptor complies with one of the following:
 - the transfer descriptor is supplied by a mobile entity and concerns downloading of data from the entity;
 - the transfer descriptor is supplied by a mobile entity and concerns uploading of data
 20 to the entity;
 - the transfer descriptor is supplied by a network-connected resource and concerns downloading of data from a mobile entity;
 - the transfer descriptor is supplied by a network-connected resource and concerns uploading of data to a mobile entity.
- 25 3. A method according to claim 1, wherein the cost criterion sets a maximum cost for effecting the data transfer.
4. A method according to claim 1, wherein the cost criterion specifies that the data transfer
 30 is to be effected at lowest cost consistent with the other transfer criteria, if any.

- 5 6. A method according to claim 1, wherein the cost criterion comprises a delay-dependent cost function for which the acceptable delay before transfer can be effected decreases with the maximum acceptable cost for the transfer, step (b) serving to determine the lowest cost at which the data transfer can be effected within a delay acceptable for that cost according to said cost function.
- 10 7. A method according to claim 1, wherein the cost criterion comprises a set of cost functions for each of which the acceptable delay before transfer can be effected decreases with the maximum acceptable cost for the transfer, successive cost functions of the set, other than a first cost function, having higher maximum acceptable cost for a given delay than a preceding cost function of the set, step (b) using each cost function in succession, starting with said first cost function, until a positive determination is made for effecting the data transfer at a cost which is within the function currently being used, this cost being the lowest cost at which the data transfer can be effected within a delay acceptable for that cost according to said cost function.
- 15 8. A method according to claim 1, wherein the transfer descriptor indicates that the data transfer is to be repeated according to a predetermined schedule, the method involving repeating steps (b) and (c) for that transfer descriptor according to said schedule.
- 20 9. A method according to claim 1, wherein said transfer criteria further comprise at least one of a minimum transfer bit rate and a maximum delay before transfer initiation.
- 25 10. A method according to claim 1, wherein the transfer descriptor references a predetermined set of transfer criteria accessible to the service system.
- 30 11. A method according to claim 1, wherein step (b) involves accessing tariff data for the cellular radio infrastructure, the tariff data being available through at least one of the following mechanisms:
 - pre-loaded into the service system from information provided off-line;

- pre-fetched over the data network from a tariff server and stored at the service system;
- fetched as needed over the data network from a tariff server;
- provided by the infrastructure in response to a specific enquiry detailing the data transfer.

11. A method according to claim 1, wherein step (b) involves a negotiation conducted between the service system and a server representing the infrastructure.

- 10 12. A method according to claim 1, wherein step (b) involves specifying the required data transfer and the transfer criteria to a server representing the infrastructure and receiving back an indication of whether the infrastructure can effect the transfer as specified.

13. A method according to claim 1, wherein step (b) involves considering more than one
15 cellular radio infrastructure for effecting the transfer and selecting the infrastructure that provides the lowest-cost fit with the transfer criteria.

14. A method according to claim 1, wherein step (b) involves considering multiple data-transfer service providers for effecting the transfer and selecting the service provider that
20 provides the lowest-cost fit with the transfer criteria.

15. A method according to claim 1, wherein step (b) involves considering more than one cellular radio infrastructure for effecting the transfer and carrying out an auction between the infrastructures to determine which infrastructure is to be used.

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16. A method according to claim 1, wherein step (b) involves considering both current and future data-transfer tariffs.

17. A method according to claim 1, wherein step (c) involves sending a message to one
30 endpoint of the data transfer specifying the set up of data transfer by that endpoint in accordance with said determination effected in step (b).

18. A method according to claim 1, wherein step (c) involves the service system contacting the infrastructure to initiate data transfer set up by the infrastructure in accordance with the determination effected in step (b).

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19. A method according to claim 1, wherein step (c) involves the service system effecting the data transfer through itself including by setting up a data transfer path with the mobile entity through the cellular radio infrastructure in accordance with the determination made in step (b).

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20. A method according to claim 1, wherein the data transfer concerns a transfer of data to the mobile entity, the data to be transferred being passed to the service system along with the transfer descriptor where it is temporarily stored, step (c) involving initiating a transfer to the mobile entity, of the data temporarily stored at the service system.

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21. A method of effecting real-time regulation of data traffic through a cellular radio infrastructure, comprising the steps of:

- (i) - effecting traffic-dependent changes to the tariff structure for data transfer through the infrastructure and making the current tariff structure accessible over to a data network; and
- (ii) - effecting the method of claim 1 using a service system connected to the data network referred to in step (i).

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22. A service system with means for effecting each of the method steps of claim 1.

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